



## King County

### Department of Natural Resources and Parks

King Street Center, KSC-NR-0700  
201 South Jackson Street  
Seattle, WA 98104-3855

October 18, 2019

Water Quality Permit Coordinator  
Attn: Maia Hoffman  
Washington State Department of Ecology  
Northwest Regional Office  
3190 160th Ave. SE  
Bellevue, WA 98008-5452

Comment Letter in Response to the Preliminary Determination to Develop a Puget Sound  
Nutrients General Permit (August 21, 2019)

Dear Ms. Hoffman:

On behalf of the King County Department of Natural Resources and Parks (DNRP), thank you for the opportunity to comment on the Washington State Department of Ecology's (Ecology) "Preliminary Determination to Develop a Puget Sound Nutrients General Permit" for municipal wastewater treatment facilities that discharge directly to Puget Sound.

King County's Wastewater Treatment Division (WTD) operates five wastewater treatment plants, four of which discharge directly to Puget Sound: the West Point, South Plant, Brightwater, and Vashon Island facilities. Collectively, these facilities serve a residential population of approximately 1.7 million people. Along with wastewater treatment, DNRP's other environmental resource programs such as stormwater management, habitat restoration and conservation, agricultural assistance, and water quality monitoring are part of King County's efforts to have clean water and healthy habitat.

DNRP recognizes Ecology's responsibility to maintain compliance with water quality standards and address dissolved oxygen (DO) impairment concerns in sensitive areas of the Sound. We commend Ecology's efforts to develop the Salish Sea Model (SSM) and examine human contributions to nutrient loading and how that affects DO in the Sound. We also appreciate Ecology's efforts to convene stakeholders to provide input on scientific modeling and discuss potential nutrient management solutions.

Based on DNRP's experience and expertise with Puget Sound water quality issues and the work of our wastewater treatment and water and land resources divisions, we believe there remains significant scientific uncertainties and gaps in available information that needs to be addressed to assure ratepayers across Puget Sound that new regulatory actions will substantively improve Puget Sound's water quality. If Ecology chooses to pursue a general permit for nutrient management at this time, the attached document details our concerns and recommendations in

terms of the regulatory development process for point sources; science, research, and monitoring considerations; nonpoint source issues; and financial considerations. A summary of these follows below:

**Align regulatory actions with scientific understanding.** Given the scientific uncertainties and Ecology's timeframe for modeling work, focus early regulatory actions on advancing scientific understanding and exploring nutrient reduction options. Requirements for nutrient caps or optimization of municipal wastewater dischargers may be premature and could be phased in when information is available to appropriately guide the necessary technology investments. To this end, we recommend that general permit conditions support scientific understanding and exploring implementation solutions that would include actions such as:

- Data collection to support modeling.
- Facility-specific planning to examine nutrient removal technologies, effectiveness, and costs, including environmental and societal impacts such as affordability, equity, energy use, and greenhouse gas emissions.
- Examining flexible compliance actions such as bubble permits (i.e., allowing a discharger to determine the best way to address nutrient reduction across all facilities owned by the discharger) and regional permit trading among different dischargers and the governance structures to implement these approaches.

Additionally, Ecology or perhaps a consortium could coordinate with municipal wastewater dischargers in drafting the general permit and involve them in the development of any draft and final general permit requirements. Many dischargers already perform nutrient removal and can offer utilities operational expertise that will be helpful to Ecology in drafting the general permit.

**Fill the significant gaps in scientific understanding.** There are many scientific uncertainties associated with understanding DO depletions in Puget Sound and the use of the SSM modeling to support regulatory requirements. We support Ecology's planned efforts to develop a watershed model and determine which nutrient discharges matter the most to areas of DO concern in the Sound. Ecology should also assess and develop DO objectives, and use the SSM modeling results, to better represent the actual sensitivity of Puget Sound marine organisms, thus better defining the desired outcomes of nutrient reduction efforts and the strategies to achieve those goals. We recommend the formation of an independent technical/scientific and steering committee to investigate ecosystem impacts from DO depletions in Puget Sound and guide additional research and modeling efforts. This information is critical to developing effective regulatory and non-regulatory management solutions.

**Incorporate nonpoint sources and solutions.** Ecology's modeling results from its "Bounding Scenarios" report dated January 2019 indicate that it will take a combination of nonpoint and point sources to achieve meaningful reductions in nutrients. King County is committed to working with Ecology on watershed modeling and refining the nonpoint source contribution of nutrients to Puget Sound. This technical information is necessary to build a regional understanding and address potential management actions related to nonpoint nutrient sources.

**Consider costs and financing needs in developing the nutrient reduction program.** Because nutrient reduction actions for municipal wastewater treatment will entail significant investments, Ecology should conduct a comprehensive cost-benefit analysis of point and nonpoint source reductions for Puget Sound. Accurate facility-specific information on the feasibility, costs, and affordability of nutrient reduction methods is needed for both point and nonpoint nutrient sources to develop cost-effective and equitable solutions and facilitate the highest-value water quality investment decisions among dischargers.

When Ecology kicked off the Puget Sound Nutrient Forum in April 2018, the stated goal was to implement the right actions, in the right sequence, to get started on improving water quality as soon as possible. King County also supports an outcome-based approach to reducing DO depletion in sensitive areas of Puget Sound, where feasible, and achieving the best water quality outcomes for the investments made. An outcome-based approach aligns with achieving a net environmental benefit as described in the “Principles for the Development of a Nutrient General Permit”, which principles we support as submitted to Ecology in a comment letter from a number of Puget Sound clean water utilities.

Finally, I would add that King County, through its Clean Water, Healthy Habitat Initiative, is committed to looking across our broad range of water quality services to implement a package of point and nonpoint approaches that will result in the best water quality outcomes. Our collective understanding of the science should inform any regulatory framework for nutrient reduction in comparison to other pollution control strategies to identify and prioritize those actions with the greatest water quality benefit.

By advancing our scientific understanding and identifying the best actions to address the DO concerns for Puget Sound we can garner financial support for the improvements. We are prepared to help Ecology in any way we can.

Thank you again for the opportunity to comment on the “Preliminary Determination to Develop a Puget Sound Nutrients General Permit.” If you have any questions, please do not hesitate to contact WTD Division Director, Mark Isaacson, at 206-477-4601 or [Mark.Isaacson@kingcounty.gov](mailto:Mark.Isaacson@kingcounty.gov), or myself at 206-477-4550 or [Christie.True@kingcounty.gov](mailto:Christie.True@kingcounty.gov).

Sincerely,



Christie True  
Director

Attachment

# King County Department of Natural Resources and Parks

## Detailed Comments on the “Preliminary Determination to Develop a Puget Sound Nutrients General Permit”

### Regulatory Development Process for Point Sources

A phased approach to developing regulatory requirements for municipal wastewater dischargers should be taken because of the scientifically complex nature of dissolved oxygen (DO) impairments in Puget Sound and the timing of ongoing programs to assess the issues. Given the substantial uncertainties regarding the human contribution of nutrient sources and their influence on DO impairments in Puget Sound, any regulatory requirements that involve nutrient reductions at this time may be premature.

Should Ecology choose to pursue a general permit for nutrient management, any regulatory requirements should be informed by science and provide a path of regulatory compliance and certainty for dischargers. Furthermore, the development of any planning or scientific assessment requirements should be consistent with the recommendations of the Marine Water Quality Implementation Strategy (IS), which Ecology is leading for the Puget Sound Partnership to develop the broad strategy and priorities for nutrient reduction.

Ecology should also consider the additional studies and timeframes that may be necessary to reduce scientific uncertainties and fully understand the relative contribution of point and nonpoint nutrient sources to DO impairment conditions. This will help Ecology coordinate with stakeholders on the appropriate discharge-specific application of the Salish Sea Model (SSM) tools to define nutrient reduction allocations across sources.

The following are specific recommendations for the development of any regulatory requirements:

- Ecology should prioritize interim regulatory requirements to address actions such as data collection and planning for nutrient reduction. Any regulatory approach should avoid requirements that would result in unintended consequences or irreversible resource commitments before understanding the equitable approach to all point and nonpoint sources contributing to the DO impairments. Any initial regulatory requirements should align with the IS process, ongoing SSM optimization scenario analyses, and the development of a watershed nutrient loading model. Any regulatory process must provide adequate time for technology analysis, planning, and implementation given the potential for substantial facility-specific technical, physical, and financial constraints. The regulatory process should outline and schedule requirements for future phases of the regulations that cannot be sufficiently developed with existing information.
- The regulatory framework should ensure that requirements result in efficient, effective, and equitable outcomes for municipal wastewater dischargers in combination with other point sources and nonpoint sources. Because it will be at least two years before the initial

optimization modeling of marine discharge scenarios is completed to understand the equivalency of nutrient loading effects to DO impairment between marine discharges and other sources, and because a watershed model does not currently exist, there is no ability at this time for Ecology to determine the equitable or most effective nutrient load reductions to improve DO impairment conditions. Consequently, several issues need to be addressed to ensure equitable solutions and avoid unnecessary or ineffective nutrient reduction investments:

- Ecology should develop a watershed model that has the capacity to integrate with SSM modeling to evaluate the spatial and temporal equivalency of the sources of oxygen-demanding stressors on DO impairments in Puget Sound. The watershed model should include sufficient functionality to evaluate the effects of separate significant sources (i.e., agricultural, stormwater, septic, forestry, etc.). (See additional comments below under “Nonpoint Source Issues.”)
- Any regulatory framework should allow dischargers to reduce nutrient loading through flexible approaches such as bubble allocations, offsets, and trading among other nutrient sources. This flexibility would be consistent with the U.S. Environmental Protection Agency’s prioritization of watershed approaches to water quality solutions. It would also allow dischargers to develop the most cost-effective and collaborative nutrient reduction solutions.
- Additional coordination with affected parties is needed to provide input on the application of the SSM to evaluating DO impairments and developing appropriate nutrient reduction allocations. Uncertainties that exist should be resolved with respect to the following:
  - Sensitivity and accuracy of SSM model parameterization for spatial and temporal representation of the effects under reduced (and increased) source loading scenarios.
  - Relative sources and influences of nitrogen versus carbon to DO impairments.
  - SSM model sensitivity to accurately assess significant changes from load reductions relative to the 0.2-mg/L DO standard where the reference DO conditions do not meet the marine DO standards.
  - Protocols for the use of model results in determining the appropriate allowable DO reductions, consistent with state anti-degradation policy, where reference DO conditions meet the marine DO standards.
  - Protocols for the use of model results to establish source nutrient load allocations consistent with the marine DO standards as specified in Washington Administrative Code (WAC) 173-201A-210(1)(d)(iii) (i.e., “D.O. measurements should be taken to represent the dominant aquatic habitat of the monitoring site.” This typically means samples should not be taken from shallow stagnant backwater areas, within isolated thermal refuges, at the surface, or at the water's edge).
  - Protocols for establishing target load reduction goals relative to policies associated with the definition of the reference condition in Puget Sound that is substantially affected by naturally occurring loading of low DO- and nutrient-rich oceanic water.

These protocols should recognize (1) WAC 173-210-260 that states, “When a water body does not meet its assigned criteria due to natural climatic or landscape attributes, the natural conditions constitute the water quality criteria.”, and (2) the recently modified Policy 1-11<sup>1</sup> that specifies new procedures to be considered in defining DO impairments.

- Ecology staff have indicated that the general permit could include caps on nutrient loading and/or optimization of nutrient reduction with existing treatment processes. Because of the existing uncertainties described above, any regulatory requirements should provide reasonable compliance time schedules to accommodate the results of ongoing SSM modeling, develop equitable approaches for point and nonpoint source discharges, allow dischargers to evaluate feasible and cost-effective methods to reduce nutrient loads, and provide maximum flexibility to achieve the requirements through trading or offset approaches.
- A future regulatory framework should allow wastewater treatment plants to be considered on a case-by-case basis in terms of their site-specific constraints, technology costs, and the equivalency and magnitude of their effects on DO impairments in Puget Sound. Ecology should partner with individual dischargers to collect site-specific technology feasibility information and develop cost-effective solutions. A one-size-fits-all regulatory approach for the entire Sound may result in the unintended imposition of implementation actions that result in little or no measurable improvement in DO impairments. WTD is currently evaluating nutrient reduction technologies for our major wastewater plants and will share the results upon completion in 2020.

## Science, Research, and Monitoring Considerations

Resolving DO impairments in Puget Sound will involve ongoing research and development activities that must be guided by the best available science. Ensuring and expanding adequate data collection, scientific analysis, and independent review is crucial to the success of this effort. All ongoing and expanded scientific work to reduce uncertainties should be explicitly incorporated into the development process of any regulatory requirements, in a manner similar to the San Francisco Bay Nutrient Management Strategy. Specifically, we recommend the following:

- An independent panel of scientific assessment and water quality subject matter experts should be formed to guide ongoing modeling work, conduct research to address data gaps, define DO objectives that are more biologically relevant to Puget Sound marine organisms, identify future monitoring and adaptive management directives, and advise the general permit advisory committee and Ecology. The charter could be modeled after the Science and Technical Advisory Committee to Chesapeake Bay or the scientific advisory committee for the San Francisco Bay Nutrient Management Strategy. The objectives of this body should include model review and assessment, nutrient science research needs,

---

<sup>1</sup> Washington’s Water Quality Assessment Listing Methodology to Meet Clean Water Act Requirements, October 2018

related effects assessment (i.e., endangered species, ocean acidification, food web, etc.), and the design of implementation progress and performance monitoring approaches. A review should be conducted of similar example technical programs to identify appropriate elements that would facilitate the best approach for the unique nutrient issues of the Puget Sound.

- Continued data collection and scientific research is needed to address the significant knowledge gaps and uncertainties in the use of the SSM and other modeling to guide development of nutrient reduction strategies. Some areas of Puget Sound, especially embayments and terminal inlets, are nutrient-limited in the summer and could be sensitive to excess nutrients from people. However, the biggest factors contributing to water quality problems will not be the same across these different areas of Puget Sound, and the susceptibility of shallow areas is not well characterized in the SSM. Thus, there is a risk that nutrient reduction strategies, management decisions, and regulatory requirements will be developed based on the misconception that nutrients are excessive in all cases and that reducing nutrients across Puget Sound will result in water quality benefits. Long-term observational data do not show significant differences from historical conditions compared to clearly observed changes in other U.S. estuaries, and do not support conclusions that existing nutrient loads are causing or contributing measurably to DO depletion conditions across Puget Sound. Additional research and evidentiary information is needed to demonstrate the potential for future increased nutrient loading to adversely affect DO conditions.
- Because Puget Sound is typically not nutrient limited, a relatively wide range of nutrient use parameters in a model may produce similar water quality predictions for DO, yet vary widely in sensitivity to nutrients contributed by humans. Ecology should evaluate the range of parameters found in literature that allow an acceptable, if non-optimal calibration. This parameter range should be used to prioritize nutrient reductions that will result in higher confidence in desired water quality improvements regardless of uncertainty in the modeling. It should also focus data collection and model improvements on improving certainty for prospective nutrient reductions whose impact on DO is dependent on model parameterization.
- The SSM currently predicts the greatest DO impairments from human contributions in embayments and shallow areas that typically have little or no historical water quality monitoring. We recommend Ecology partner with appropriate organizations to install and maintain data collection moorings in regions most sensitive to these types of nutrients. These data should be used to evaluate and update the SSM's calibration and determine if additional processes need to be incorporated into the model to provide adequate predictive ability in these regions.
- Scientific expertise and studies should be engaged to evaluate the sensitivity of marine organisms (or other beneficial uses) affected by DO conditions in Puget Sound. This is necessary to support Ecology's application of the SSM and other models in determining the appropriate and most effective nutrient load reductions and implementation actions for achieving measurable DO improvements and developing effective monitoring and adaptive management strategies. The sensitivity analyses are needed to resolve

uncertainties of SSM performance to accurately assess biological processes that affect DO.

- Additional models should be used in conjunction with the SSM to evaluate confidence in meeting water quality outcomes. The intention is to support SSM modeling efforts, improve confidence in the sensitivity and appropriate interpretation of SSM results, and improve understanding in underlying processes that drive nutrient and DO dynamics. Findings will be stronger when multiple lines of evidence are in agreement and, when properly framed, can lead to greater stakeholder acceptance of model results and decisions<sup>2</sup>.

## Nonpoint Source Issues

The SSM modeling effort demonstrates that a variety of wastewater, watershed, and background oceanic nutrient sources affect DO in Puget Sound. Given this evidence, an inclusive watershed approach is necessary to realize a successful and scientifically defensible reduction strategy. An appropriate emphasis on nonpoint sources is vital to this effort and will support the development of the most innovative and cost-effective solutions to nutrient reduction.

- Ecology should develop a watershed model to characterize specific point and nonpoint nutrient sources entering Puget Sound. This effort should include a data-driven study of current nonpoint sources and the equivalency of their effect on Puget Sound (in particular, the most DO-impaired regions). The watershed model is necessary to developing appropriate nutrient allocations and reduction responsibilities, and will support innovative reduction solutions.
- An assessment should be conducted of available nutrient reduction practices and technologies, technical feasibility, and costs for nonpoint sources to facilitate cost-effective and innovative entrepreneurial nutrient reduction solutions.
- The regulatory development process should evaluate the regulatory and enforcement framework for nonpoint source dischargers to ensure parity and appropriate responsibility between point and nonpoint sources.
- It is important to make a clear connection between BMPs for nutrient reduction and a measurable impact on Puget Sound water quality outcomes. In addition to modeling efforts, observations are needed to show changes from BMP actions. This could involve a pilot project or special study in a specific watershed to build scientific understanding of the problem and potential solutions.

---

<sup>2</sup> Weller et al. 2014. Multiple Models for Management in the Chesapeake Bay. Prepared for the Science and Technical Advisory Committee Report (STAC). STAC Publication 14-004. (July). Annapolis, MD. Available at: [https://repository.si.edu/bitstream/handle/10088/22188/serc\\_WellerEtAl2014STACreportOnMultipleModelsForChesapeakeManagement.pdf?sequence=1&isAllowed=y](https://repository.si.edu/bitstream/handle/10088/22188/serc_WellerEtAl2014STACreportOnMultipleModelsForChesapeakeManagement.pdf?sequence=1&isAllowed=y).



## Financial Considerations

Ecology should adequately consider the costs and financing needs that dischargers will face from any regulatory requirements that trigger nutrient reduction investments. The following recommendations are essential to ensuring successful and cost-effective nutrient reduction in Puget Sound:

- The regulatory process should include collecting detailed data on the cost for site-specific point sources and regional best management practices (BMPs). The 2011 TetraTech study commonly cited by Ecology made broad-based assumptions that are too coarse (and outdated) to support accurate planning and implementation decisions.
- As recommended in the Draft Costs and Values Synthesis Report (Northern Economics, August 2019) commissioned by Ecology, Ecology should study and consider the relative cost-effectiveness and net benefits of various point and nonpoint source water quality improvements. This analysis should be used to inform the regulatory framework before implementing nutrient reduction options that could be relatively more costly and less beneficial.
- Ecology could partner with other agencies and organizations to advocate for additional funding and ensure that implementation actions to meet the general permit requirements do not result in significant affordability issues or disproportionately affect less wealthy households. In particular, the expansion of the State Revolving Fund program and other state funding programs are needed to accommodate necessary expenditures.